



**I O C D**

## **International Organization for Chemical Sciences in Development**

*Promoting the chemical sciences  
for global sustainable development*

Established in 1981 at UNESCO, IOCD was the first international non-governmental organization devoted to enhancing the role of the chemical sciences in development and involving chemists in low- and middle-income countries (LMICs), enabling them to contribute to key science and technology areas for development.

For 35 years, IOCD has supported work on sustainable development, including in the fields of natural products, analytical, environmental and medicinal chemistry and the ethical exploitation of natural resources. IOCD has worked to strengthen education in the chemical sciences, supporting advanced training workshops, the use of microscale equipment for teaching practical chemistry, and organizing donations of books and equipment to institutions in LMICs.

IOCD's current programme is focused on two priority areas:

- A. *Chemistry for Better Health and a Better Environment*
- B. *Strengthening Education in the Chemical Sciences*

IOCD is affiliated with **UNESCO** and works in partnership with a range of organizations, including the **International Union of Pure and Applied Chemistry**, in pursuing its mission.

IOCD is proud to be in official collaboration with the **African Academy of Sciences**, with which a Memorandum of Understanding was signed in 2012.

**For further information and details of IOCD's programmes**

Visit IOCD's Website:  
[www.iocd.org](http://www.iocd.org)

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### *The Ishango Bone*

**An enduring symbol of mankind's intellectual progress  
and a star of archaeology from the heart of Africa**

## The Ishango Bone

### History of the Ishango Bone

In 1935, while conducting a scientific research trip, the zoologist Hubert Damas from Liège University, Belgium, discovered the remains of ancient human activity in the Ishango region on the shores of Lake Edward in what is now the Democratic Republic of Congo. The Belgian geologist Jean de Heinzelin de Braucourt carried out archaeological excavations at the Ishango site from 1950 on and uncovered many hundreds of thousands of objects, including human bones and bone harpoon heads dating from 20,000 to 25,000 years ago. Among the finds he made in 1957 was a remarkable artefact which has become known as the Ishango Bone, now held at the Royal Belgian Institute of Natural Sciences (RBINS), Brussels.

### What is the Ishango Bone?

The Ishango Bone is one of very few surviving composite tools. 10 cm long, it is made of two pieces – a dark brown bone handle (probably shaped from the fibula of a baboon) with a sharp piece of quartz affixed to one end. The bone handle is notched on three sides with columns of parallel lines in groups.

### Significance of the Ishango Bone

The extensive working of the handle of the Ishango Bone and the fixing of the sharp quartz appendage attest to the level of technological skill of human beings at the time in manipulating

materials for their use. The primary purpose of the object may have been as a tool such as a knife, but it is the arrangement of the 168 parallel lines cut into the handle in groups that has made the Ishango Bone such an object of interest around the world.

At its simplest, the Bone might have been used as a ‘tally’ or ‘counting’ stick’ – a way of recording the numbers of objects (e.g. domesticated animals) being owned or traded. Many examples of such sticks have been found, including from well before the period when the Ishango Bone was made.

But analysis of the groupings of lines shows that they form patterns that seem to have a more complex purpose. Within the three columns of notches there are patterns that appear to demonstrate knowledge of prime numbers, addition and subtraction.

Another theory is that the markings on the Bone may have been used as a form of six-month lunar calendar.

Whatever the precise purpose for which it was used, the Ishango Bone is considered by experts to attest to the practice of arithmetic at this stage in human history, more than 20,000 years ago. It provides an enduring symbol of mankind’s intellectual progress and is truly a star of archaeology from the heart of Africa.

## Replicas of the Ishango Bone

After an international conference in Brussels in 2007 on “*Ishango, 22000 and 50 Years Later: The Cradle of Mathematics?*”, an artist’s model of the Bone was fabricated as a 7-meter high fibreglass replica, unveiled in 2010 and now exhibited at RBINS, Brussels.

In 2014, IOCD was asked to assist a project to make copies of the Ishango Bone for display in different places as a symbol of early science in Africa. IOCD worked closely with a number of partners in the project, including the African Academy of Sciences (AAS), Nairobi, the International Institute of Theoretical Physics, Trieste, RBINS, UNESCO, University of Namur, Vitro Laser Solutions UG and Prof. Malik Maaza, University of South Africa.

2015 is the UN International Year of Light and Light-based Technologies. A fitting way to mark this was to create a 21<sup>st</sup> century version of the prehistoric original, using glass and light to display the Bone’s unique character.

With IOCD’s help, the RBINS museum provided a 3D scan of the Bone to use in making a series of replicas. Vitro, a German glass fabrication company, was commissioned to make two sets of replicas. In a 2D impression, the representation of the Ishango Bone is a 1.5 m tall plate of glass in which the enlarged image of two faces of the

original has been engraved using a laser beam. The refractive index of the glass allows special light effects to be created inside the plate by LED sources located at an edge and powdered by sunlight. In a 3D version, an enlarged solid image is laser-engraved in a 20 cm tall glass block.

A replica of the Bone was presented to AAS in 2015, for permanent display at its Nairobi headquarters.



1.5 m image – blue light.  
Photo: Vitro Laser Solutions UG

S.A. Matlin, A. Krief, P. Lambin. IOCD, 2015